



Understanding the Combined Effects of Environmental Chemical and Non-Chemical Stressors: Atherosclerosis as a Model

April 3-4, 2018

**Co-Sponsored by the National Institute of Environmental Health Sciences
and National Heart, Lung, and Blood Institute**

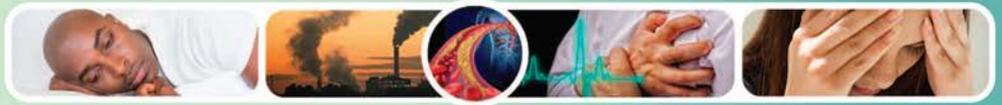
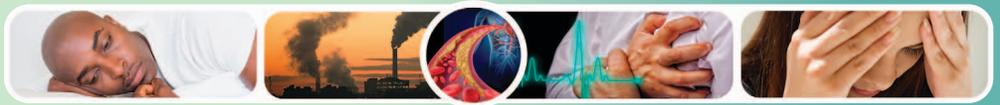


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Agenda



Understanding the Combined Effects of Environmental Chemical and Non-Chemical Stressors: Atherosclerosis as a Model

April 3-4, 2018

NIEHS Building 101, Rodbell Auditorium
111 TW Alexander Drive, Research Triangle Park, North Carolina

DAY ONE – Tuesday, April 3, 2018

- 7:30 a.m.** **Registration**

- 8:30 a.m.** **Opening Remarks/Goals of Workshop/Housekeeping Items**
Danielle Carlin, Ph.D., National Institute of Environmental Health Sciences (NIEHS)

- 8:45 a.m.** **Opening Remarks**
Linda Birnbaum, Ph.D., NIEHS

- 8:55 a.m.** **Opening Remarks**
David Goff, M.D., Ph.D., National Heart, Lung, and Blood Institute (NHLBI)

Session One: Environmental Chemical Stressors and Atherosclerosis | Moderator: Bill Suk, Ph.D., NIEHS

- 9:05 a.m.** **Overview of Atherosclerosis and Chemical Stressors**
Wayne Cascio, M.D., U.S. Environmental Protection Agency (EPA)

- 9:25 a.m.** **Metals and Cardiovascular Disease: Epidemiologic Evidence, Potential Mechanisms, and Opportunities for Prevention**
Ana Navas-Acien, M.D., Ph.D., Columbia University

- 9:45 a.m.** **Air Pollution and Animal Models of Atherosclerosis**
Jesus Araujo, M.D., Ph.D., University of California, Los Angeles (UCLA)

- 10:05 a.m.** **Defining Mechanisms of Arsenic-Enhanced Atherosclerosis in Mouse Models**
Koren Mann, Ph.D., McGill University

- 10:25 a.m.** Break

Session Two: Non-Chemical Stressors and Atherosclerosis | Moderator: Catherine Stoney, Ph.D., NHLBI

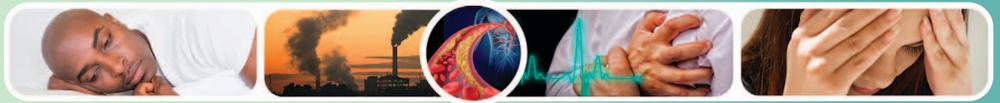
- 10:40 a.m.** **Lifestyle Effects on Atherosclerosis**
Filip Swirski, Ph.D., Massachusetts General Hospital

- 11:00 a.m.** **Atherosclerosis and Non-Chemical Stressors**
Zahi Fayad, Ph.D., Icahn School of Medicine at Mount Sinai

- 11:20 a.m.** **Novel Biomarkers for Risk Prediction in Coronary Artery Disease**
Arshed Quyyumi, M.D., Emory University

- 11:40 a.m.** **Dietary Mitigation of Psychosocial Stress Effects on Health in Female Primates**
Carol Shively, Ph.D., Wake Forest University

- Noon** LUNCH (NIEHS Cafeteria)

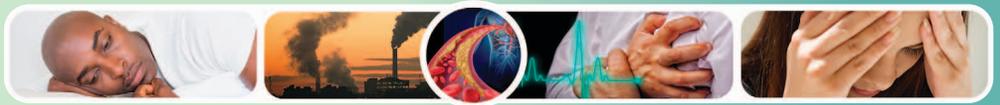


Session Three: Modifying Factors of Atherosclerosis | Moderator: Michelle Olive, Ph.D., NHLBI

- 1:00 p.m.** **Spatiotemporal Trends of Heart Disease**
Michele Casper, Ph.D., Centers for Disease Control and Prevention (CDC)
- 1:20 p.m.** **Genetic/Epigenetic Susceptibility in Atherosclerosis: Importance in Considerations of Chemical and Non-Chemical Stressors**
Cavin Ward-Caviness, Ph.D., EPA
- 1:40 p.m.** **The Interaction of Psychological Stress and Metal Exposures: Effects on Children’s Cardiovascular Functioning and Subclinical Cardiovascular Disease**
Brooks Gump, Ph.D., Syracuse University
- 2:00 p.m.** **Interactions Between Chemical Stressors and Diet**
Michael Petriello, Ph.D., University of Kentucky
- 2:20 p.m.** **The Social and Physical Context of Health Behaviors Associated With Atherosclerosis: Parks and Physical Activity**
Deborah Cohen, M.D., RAND Corporation
- 2:40 p.m.** Break

Session Four: Chemical and Non-Chemical Stressors in Atherosclerosis: Can They Be Studied Together?
Moderator: Janice Allen, Ph.D., NIEHS

- 2:55 p.m.** **Air Pollution, Psychosocial Stress, and Subclinical Atherosclerosis: Can We Identify Vulnerable Populations?**
Anjum Hajat, Ph.D., University of Washington
- 3:15 p.m.** **Non-Chemical Stressors as Vulnerabilities for Cardiovascular Disease**
Karina Davidson, Ph.D., Columbia University
- 3:35 p.m.** **Using Adverse Outcome Pathways to Document the Collective Causes of Atherosclerosis**
Stephen Edwards, Ph.D., RTI International
- 3:55 p.m.** **The Current State of Cumulative Risk Assessment**
Glenn Rice, Ph.D., EPA
- 4:15 p.m.** **Group Discussion/Address Additional Questions**
- 5:00 p.m.** **Meeting Adjourned;** Shuttle Takes Participants Back to Hotel
- 6:30 p.m.** **Group Dinner** at Mez Contemporary Mexican Restaurant
5410 Page Road, Durham, North Carolina



DAY TWO – Wednesday, April 4, 2018

7:30 a.m. Registration

8:30 a.m. Opening Remarks/Goals of Workshop/Synthesis of Day 1/ Housekeeping Items
Michelle Olive, Ph.D., NHLBI

8:45 a.m. Environmental Factors in Atherosclerosis: Lessons From Research on Ambient Air Pollutants
Joel Kaufman, M.D., University of Washington

9:05 a.m. Break

9:20 a.m. Breakout Session One: Determining Knowledge Gaps and Future Directions for Research

Breakout Group One: Rodbell A

Moderators: Danielle Carlin, Ph.D., NIEHS, and Jesus Araujo, M.D., Ph.D., UCLA

Breakout Group Two: Rodbell B

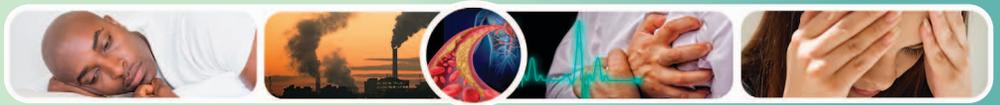
Moderators: Michelle Olive, Ph.D., NHLBI, and Koren Mann, Ph.D., McGill University

Breakout Group Three: Rodbell C

Moderators: Catherine Stoney, Ph.D., NHLBI, and Carol Shively, Ph.D., Wake Forest University

Breakout Session One: Please Address the Following Questions:

- 1) Which environmental chemicals are known to affect key biological mechanisms/pathways leading to atherosclerosis, and which key biological mechanisms/pathways are affected by these chemicals?
- 2) Which non-chemical stressors are known to affect key biological mechanisms/pathways leading to atherosclerosis, and which key biological mechanisms/pathways are affected by these non-chemical stressors?
- 3) Which key biological mechanisms/pathways of atherosclerosis are known to be affected by the combined exposures of chemical and non-chemical stressors?
- 4) What are the qualitative and quantitative (i.e., dose-response) impacts of exposure to the combination of chemical and non-chemical stressors and technical challenges in quantitative assessment of these exposures or impacts?
- 5) What are the types of scientific data (e.g., mechanistic, epidemiological) needed to address underlying knowledge gaps of chemical and non-chemical stressors leading to atherosclerosis?
- 6) What are the new technologies and innovative research approaches that could be leveraged to address these underlying knowledge gaps?



10:30 a.m. Breakout Session Two: Developing an Adverse Outcome Pathway

Breakout Group One: Rodbell A

Moderators: Stephen Edwards, Ph.D., RTI, and Daniel Conklin, Ph.D., University of Louisville

Breakout Group Two: Rodbell B

Moderators: Andrew Rooney, Ph.D., NIEHS, and Karina Davidson, Ph.D., Columbia University

Breakout Group Three: Rodbell C

Moderators: Glenn Rice, Ph.D., EPA, and Changcheng Zhou, Ph.D., University of Kentucky

Breakout Session Two: Please Address the Following Questions:

- 1) What are the biological measurements (e.g., blood pressure, c-reactive protein, cholesterol) that should be used to follow the progression of perturbations associated with chemical and non-chemical stressors to atherosclerosis?
- 2) What are the biological events corresponding to these measurements (i.e., key events)?
- 3) How are these key events causally related (i.e., key event relationships)?
- 4) How would you illustrate the adverse outcome pathway (see attached PowerPoint template)?
- 5) What evidence supports the key event relationships? Components of evidence include biological plausibility and empirical support (i.e., temporal concordance and response/response concordance).
- 6) What additional information is needed (i.e., knowledge gaps) to increase confidence in the existing key event relationships or to complete a pathway?
- 7) What basic, clinical, and epidemiological tools are needed to monitor the pathways?

11:30 a.m. LUNCH (NIEHS Cafeteria)

12:30 p.m. Breakout Session Two: Developing an Adverse Outcome Pathway (continued)

1:15 p.m. Break

1:30 p.m. Report Back to Audience

Moderator: Cynthia Rider, Ph.D., NIEHS

Breakout Group One (20 minutes)

Breakout Group Two (20 minutes)

Breakout Group Three (20 minutes)

2:30 p.m. Open Discussion With Audience

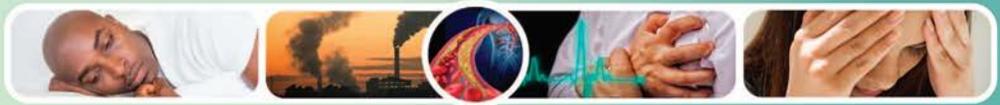
3:00 p.m. Closing Remarks and Next Steps

Danielle Carlin, Ph.D., NIEHS, and Michelle Olive, Ph.D., NHLBI

3:30 p.m. Meeting Adjourned



Scientific Planning Committee



Workshop Co-Chairs

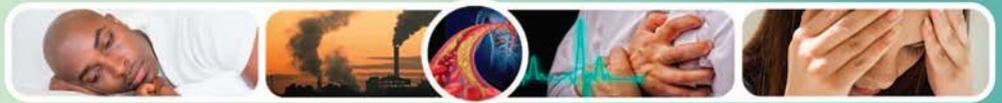
Danielle Carlin NIEHS
 Michelle Olive National Heart, Lung, and Blood Institute
 Catherine Stoney..... National Heart, Lung, and Blood Institute

Scientific Planning Committee

Janice Allen NIEHS
 Wayne Cascio U.S. Environmental Protection Agency
 Yuxia Cui NIEHS
 Steve Edwards..... RTI International
 Barbara Gittleman..... NIEHS
 Michelle Heacock..... NIEHS
 Heather Henry..... NIEHS
 Ron Hines U.S. Environmental Protection Agency
 Mike Humble..... NIEHS
 Bonnie Joubert NIEHS
 Moiz Mumtaz Agency for Toxic Substances and Disease Registry
 Wendy O’Brien..... U.S. Environmental Protection Agency
 Youngsuk Oh National Heart, Lung, and Blood Institute
 Hana Pohl Agency for Toxic Substances and Disease Registry
 Glenn Rice U.S. Environmental Protection Agency
 Cynthia Rider..... National Toxicology Program/NIEHS
 Andrew Rooney..... National Toxicology Program/NIEHS
 John Rogers..... U.S. Environmental Protection Agency
 Thad Schug..... NIEHS
 William Suk..... NIEHS



Breakout Groups Active Participants



GROUP 1

Breakout Session #1:

Moderators: Danielle Carlin, Ph.D., *NIEHS* and Jesus Araujo, M.D., Ph.D., *UCLA*

Breakout Session #2:

Moderators: Stephen Edwards, Ph.D., *RTI* and Daniel Conklin, Ph.D., *University of Louisville*

Active Participants

Jesus Antonio Araujo
Danielle Carlin
Michele Casper
Daniel Conklin
Yuxia Cui
Stephen Edwards
Robert Furberg

Young-Mi Go
Anjum Hajat
Jaime Hart
Heather Henry
Andrew Morris
Rakesh Patel
Thomas Register

GROUP 2

Breakout Session #1:

Moderators: Michelle Olive, Ph.D., *NHLBI* and Koren Mann, Ph.D., *McGill University*

Breakout Session #2:

Moderators: Andrew Rooney, Ph.D., *NIEHS* and Karina Davidson, Ph.D., *Columbia University*

Active Participants

Janice Allen
Aruni Bhatnagar
Wayne Cascio
Karina Davidson
Zahi Fayad
Chiara Giannarelli
David Goff
Ron Hines

Joel Kaufman
Koren Mann
Jaymie Meliker
Michelle Olive
Arshed Quyyumi
Andrew Rooney
Sanjay Srivastava

GROUP 3

Breakout Session #1:

Moderators: Catherine Stoney, Ph.D., *NHLBI* & and Carol Shively, Ph.D. *Wake Forest University*

Breakout Session #2:

Moderators: Glenn Rice, Ph.D., *U.S. EPA* and Changcheng Zhou, Ph.D., *University of Kentucky*

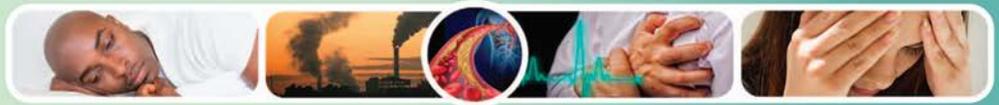
Active Participants

Reto Asmis
Deborah Cohen
Michelle Heacock
Dean Jones
Nick Leeper
Matthias Nahrendorf
Ana Navas-Acien

Michael Petriello
Glenn Rice
Cynthia Rider
Carol Shively
Catherine Stoney
Cavin Ward-Caviness
Changcheng Zhou



Biographies



Janice Allen

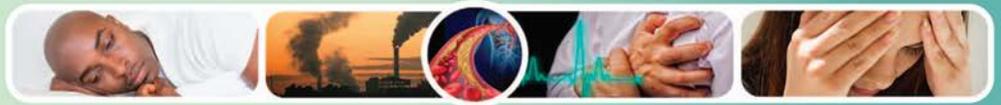
National Institute of Environmental Health Sciences

Janice Allen, Ph.D., received her bachelor's degree in chemistry and biology from The University of North Carolina at Chapel Hill and her doctorate in cell biology and biotechnology from the North Carolina State University College of Veterinary Medicine (NCSU-CVM). Her research concentrates on the pathogenesis of inflammation, with a focus in in vitro and in vivo models of acute and chronic inflammation, cytokines and growth factors, oxidative stress, transcriptional factors, and regulation of gene expression. Previously, Allen worked at the National Institute of Diabetes and Digestive Kidney Diseases and National Institute of Dental and Craniofacial Research as an intramural chemist. After this position, she joined the faculty at the NCSU-CVM. Here, she received funding from various sources, including the National Institutes of Health, to perform research. Allen has mentored several undergraduate and graduate students and postdoctoral fellows while at with NIH and NCSU-CVM. Additionally, she has served as a Scientific Review Officer for the National Institute of Environmental Health Sciences since 2002. In this position she is responsible for the initial review of research grant and fellowship applications and contracts assigned to the NIEHS. Allen is also responsible for recruiting scientists from academia and industry with specific expertise for each grant application. Allen has published over 75 research articles in scientific journals, has presented several abstracts at national and international meetings, and holds two patents.

Jesús Araujo

University of California at Los Angeles

Jesús Araujo, Ph.D., was born in Caracas, Venezuela where he received his medical doctorate, magna cum laude, at the Central University of Venezuela, and his Master of Science in immunology at the Venezuelan Institute for Scientific Research. Araujo subsequently completed his residency in internal medicine at the Albert Einstein College of Medicine at Beth Israel Medical Center in New York, and his cardiology fellowship at University of California, Los Angeles (UCLA) Medical Center in Los Angeles. Araujo also obtained a doctoral degree in molecular biology from the Molecular Biology Institute at UCLA. Currently, Araujo is an Associate Professor of Medicine and Environmental Health Sciences, at the David Geffen School of Medicine and Fielding School of Public Health at UCLA. He is a member of the Scientific Research Panel for the Air Resources Board of the California Environmental Protection Agency. Araujo leads the Environmental Cardiology and Vascular Biology Laboratory at UCLA with a focus on: 1) dissecting mechanisms how exposure to air pollution promotes atherosclerosis and heart disease, and 2) study of vascular oxidative stress and gene-environment interactions of relevance in ischemic heart disease.



Reto Asmis

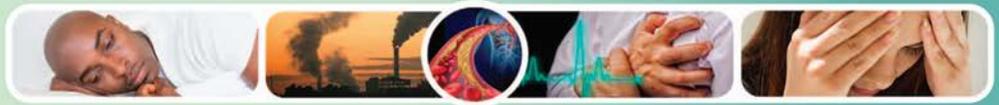
Wake Forest University

Reto Asmis, Ph.D., is a professor, industry consultant, company founder, and former senior associate dean. He has more than 25 years of experience establishing, leading, and growing innovative life sciences programs in the United States and Europe, as well as developing and commercializing promising biomedical products. As a tenured professor and Associate Director for Education in the Center for Precision Medicine at the Wake Forest School of Medicine, Asmis directs federally funded basic, biomedical, and translational interdisciplinary research programs in cardiovascular biology, vascular imaging, and nutrition. He maintains multiple national and international collaborations and has mentored and trained numerous undergraduate and graduate students, postdoctoral fellows, and junior faculty. He is on the editorial board of six international scientific journals. Asmis is also a founding shareholder and former chief scientific advisor of EO2 Concepts, Inc., a San Antonio-based advanced wound care technology company. He is also the co-founder and President of Exprimon Corporation, a new San Antonio-based nutraceutical company.

Aruni Bhatnagar

University of Louisville

Widely regarded for spearheading the new field of Environmental Cardiology, Aruni Bhatnagar, Ph.D., a Smith and Lucille Gibson Professor of Medicine at the University of Louisville, has spent more than 25 years studying the impact of toxic substances, tobacco smoke constituents, and environmental pollutants on heart disease. He is a graduate of Kanpur University, India and received his post-doctoral training at the University of Texas Medical Branch at Galveston. Bhatnagar is known for his pioneering work on the metabolism of toxic substances in ambient air and tobacco smoke, and how they affect the development of cardiovascular disease and diabetes. He has published over 225 research papers, commentaries and review articles, and 20 book chapters. A leader in cardiovascular health, he has participated in more than 50 peer-review panels of the National Institutes of Health and has served as a member of the Institute of Medicine's Committee on Secondhand Smoke Exposure and Acute Coronary Events, as well as the Committee on Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan. For the last 7 years, Bhatnagar has served as Deputy Editor of the American Heart Association journal- Circulation Research. His research has been supported by the National Institutes of Health, the U.S. Environmental Protection Agency, the Department of Defense, and the American Heart Association. He currently serves as Director of the Diabetes and Obesity Center at the University of Louisville and Director of the American Heart Association Tobacco Regulation and Addiction Center.



Linda Birnbaum

National Institute of Environmental Health Sciences

A board-certified toxicologist, Linda Birnbaum, Ph.D., has served as a federal scientist for over 37 years. She has received many awards and recognitions, including the North Carolina Award in Science, the Women in Toxicology Elsevier Mentoring Award, the Society of Toxicology Public Communications Award, U.S. Environmental Protection Agency's (EPA) Health Science Achievement Award and Diversity Leadership Award, the National Center for Women's 2012 Health Policy Hero Award, the Breast Cancer Fund Heroes Award, and 14 Science and Technology Achievement Awards, which reflect the recommendations of EPA's external Science Advisory Board, for specific publications. Birnbaum was also elected to the Institute of Medicine of the National Academies and received an honorary degree from Ben-Gurion University in Israel.

Birnbaum is a former president of the Society of Toxicology, the largest professional organization of toxicologists in the world; former chair of the Division of Toxicology at the American Society of Pharmacology and Therapeutics; and former vice president of the American Aging Association. She is the author of more than 800 peer-reviewed publications, book chapters, and reports. She is also an adjunct professor at several universities, including the University of North Carolina at Chapel Hill and Duke University.

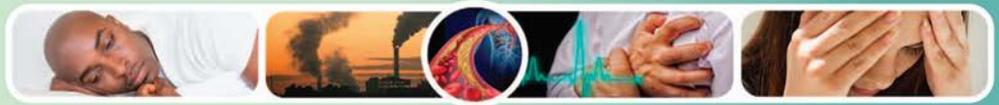
A native of New Jersey, Birnbaum received her master's and doctoral degrees in microbiology from the University of Illinois at Urbana-Champaign.

Danielle Carlin

National Institute of Environmental Health Sciences

Danielle Carlin, Ph.D., is a program administrator with the Superfund Research Program (SRP). Her position consists of providing guidance and advice to grantees applying for SRP P42 Center grants and serving as the lead liaison between SRP trainees and the various training opportunities offered by SRP. She also oversees the xenobiotic metabolism and asbestos grant portfolios (e.g., R01s). Her current research interests include chemical mixtures, combined exposures, metals, asbestos, and xenobiotic metabolism.

Prior to her current position, she was a post-doctoral researcher for four years at the University of North Carolina: two years within the Eshelman School of Pharmacy, Division of Molecular Pharmaceutics, studying aerosolized drugs/vaccines for treatment and prevention of tuberculosis; and two years within the Curriculum in Toxicology conducting her research at the U.S. Environmental Protection Agency, in Research Triangle Park, N.C., where she studied the toxicological effects of exposure to Libby amphibole asbestos in the rat model. Her areas of expertise include cardiopulmonary/reproductive physiology and inhalation toxicology/pharmacology. She received her doctorate in 2005 from Kansas State University,



College of Veterinary Medicine, Department of Anatomy and Physiology. She also has a Bachelor of Science and Master of Science in animal science from New Mexico State University

Wayne Cascio

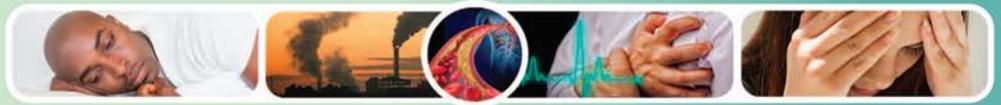
U.S. Environmental Protection Agency

Wayne Cascio, M.D., is Acting Director of the National Health and Environmental Effects Research Laboratory, Office of Research and Development at the U.S. Environmental Protection Agency (EPA). Wayne earned his bachelor's degree from Johns Hopkins University, and an M.D. from the University of Maryland. He completed clinical training in internal medicine, and cardiovascular diseases at the University of North Carolina and post-doctoral training in basic electrophysiology and pharmacology at the Physiologisches Institut, Universität Bern, Switzerland. Prior to joining the EPA in 2011, Wayne worked to increase access to cardiovascular health care in underserved rural areas and served on the EPA's Clean Air Scientific Advisory Committee for Particulate Matter. He now serves as the EPA's liaison to Federal Fire Science Coordinating Committee, CDC's National Center for Environmental Health-Agency for Toxic Substances and Disease Registry Board of Scientific Councilors, and the Institute of Medicine's Roundtable on Environmental Health Sciences, Research and Medicine. Wayne has authored or co-authored more than 180 journal articles and book chapters. He is a recipient of a 2013 EPA Gold Medal for Exceptional Service, a 2013 Office of Research and Development Impact Award, and numerous Scientific and Technological Achievement Awards. His current research includes the study of the health effects of environmental pollutants especially wildland fire smoke for informing risk assessment, risk-management decisions, and improvement of public health and quality of life through increased environmental health communication and literacy. Wayne is a clinician and scientist and is board certified by the American Board of Internal Medicine in Internal Medicine and Cardiovascular Diseases.

Michelle Casper

Centers for Disease Control and Prevention

Michele Casper, Ph.D., is the team lead for the Small Area Analysis Team within the Division for Heart Disease and Stroke Prevention at Center of Disease Control and Prevention (CDC). The activities of her team include the Interactive Atlas of Heart Disease and Stroke, the GIS Capacity Building Project for State and Local Health Departments, the Chronic Disease GIS Exchange, and the study of spatiotemporal Trends in Heart Disease and Stroke. She is interested in reducing the geographic disparities in heart disease and stroke and using local-level data to tailor heart disease and stroke prevention efforts to the specific needs of communities. Michele received her doctorate in epidemiology from The University of North Carolina.



Deborah Cohen
RAND Corporation

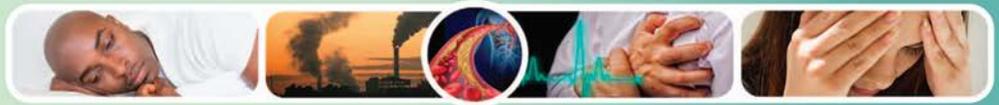
Deborah Cohen, M.D., is a Senior Scientist at the RAND Corporation and the author of the book “A Big Fat Crisis—the Hidden Forces Behind the Obesity Epidemic—and How We Can End It”. Her major area of research is on the impact of the built and social environments on health and health behaviors. She is board certified in Public Health and Preventive Medicine. She is the lead researcher on several studies on parks and physical activity, including the National Study of Neighborhood Parks, which has assessed park use in 193 parks in 27 U.S. cities.

Gwen Collman
National Institute of Environmental Health Sciences

Gwen Collman, Ph.D., is director of the NIEHS Division of Extramural Research and Training where she leads approximately 60 professional staff in areas of scientific program administration, peer review, and the management and administration of about 1,500 active grants each year. She directs scientific activities across the field of environmental health sciences including basic sciences (i.e., DNA repair, epigenetics, environmental genomics), organ-specific toxicology (i.e., reproductive, neurotoxicology, respiratory), public health related programs (i.e., environmental epidemiology, environmental public health), and training and career development. She also oversees the implementation of the Superfund Research Program and the Worker Education and Training Program.

Prior to her current role, Collman served in program development and management, beginning in 1992 as a member, then as Chief of the Susceptibility and Population Health Branch. During this time, she directed research on the role of genetic and environmental factors on the development of human disease, from animal models of genetic susceptibility to population studies focusing on etiology and intervention. She was responsible for building the NIEHS grant portfolio in environmental and molecular epidemiology and developed several complex multidisciplinary research programs. These include the NIEHS Breast Cancer and the Environment Research Centers Program, the NIEHS/U.S. EPA Centers for Children's Environmental Health and Disease Prevention, and the Genes, Environment and Health Initiative. Also, under her guidance, a team created a vision for the Partnerships for Environmental Public Health programs for the next decade.

In recognition of her achievements, she is the recipient of numerous NIEHS Merit Awards, two NIH Director's Awards, and the DHHS Secretary's Award for Distinguished Service. Collman received a Ph.D. in Environmental Epidemiology from the University of North Carolina School of Public Health where she was awarded the 2009 H.A. Tyroler Distinguished Alumni Award.



Daniel Conklin

University of Louisville

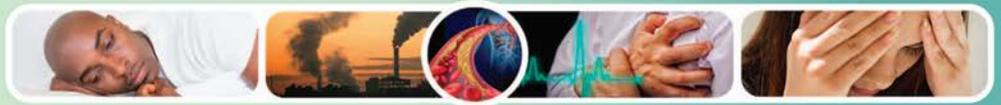
Daniel Conklin, Ph.D., is a Professor of Medicine in the Division of Cardiovascular Medicine at the University of Louisville. He received a doctorate in cardiovascular physiology at the University of Notre Dame and studied cardiovascular toxicology as an National Institute of Environmental Health Sciences-funded Postdoctoral Fellow at the University of Texas Medical Branch. Conklin was an Assistant/Associate Professor in the Department of Biological Sciences at the University of Wisconsin-Eau Claire before moving to the University of Louisville to research Environmental Cardiology with Aruni Bhatnagar, Ph.D., and Sanjay Srivastava, Ph.D. Currently, Conklin supports the Diabetes and Obesity Center, an U.S. EPA-funded Superfund Center, and the U.S. Food and Drug Association and American Heart Association-supported Tobacco Regulation and Addiction Center. His research investigates the role of aldehydes and their metabolism in cardiovascular toxicity in animals and humans. He is a permanent member of the NIH Systemic Injury of Environmental Exposure study section and a regular ad hoc peer reviewer. He is an Associate Editor of Toxicology and Applied Pharmacology and he is on the Editorial Board of Circulation Research. Conklin is an author and co-author of over 90 publications, including peer-reviewed articles, book chapters, and invited reviews. A Society of Toxicology (SOT) member since 2001, he is current Vice-President of the Ohio Valley SOT Regional Chapter, a past President of the Cardiovascular Toxicology Specialty Section, and a member of both the Stem Cell and the Inhalation and Respiratory Specialty Sections.

Yuxia Cui

National Institute of Environmental Health Sciences

Yuxia Cui, Ph.D., is a contract scientific program analyst in the Exposure, Response, and Technology Branch of NIEHS. She supports research activities related to the development, validation and application of novel technologies and innovative approaches for improved exposure and response assessment, including sensor technologies, omics-based approaches as well as computational and informatics-based methodologies. In addition, she serves as a program staff representative in the CHEAR program, working with extramural grantees, to coordinate and oversee Laboratory quality assurance and quality control activities.

Before joining the Division of Extramural Research and Training, Cui conducted postdoctoral research in the Division of Intramural Research of NIEHS studying off target/toxic effects of therapeutic drugs as well as DNA damage response pathways, applying both toxicogenomic and traditional molecular biology approaches. Cui received her doctorate in Environmental Toxicology from Duke University in 2007.



Karina Davidson
Columbia University

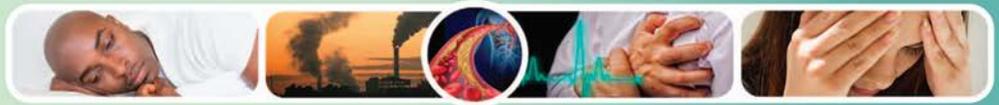
Karina Davidson, Ph.D., is a professor in the Departments of Medicine, Cardiology, and Psychiatry, and the Vice-Dean of Organizational Effectiveness at Columbia University. She joined Columbia University Medical Center in 2003 to grow an international, interdisciplinary think-tank of cardiologists, internists, psychologists, exercise physiologists and other related scientists. The guiding purpose of this collaboration is to tackle how behavior, health and social disparities affect the biology and incidence of hypertension and heart disease, as well as patients' disease course and outcomes.

Davidson's patient-oriented research focuses on behavioral and biopsychosocial influences on cardiovascular disease, including mechanisms by which these factors influence cardiovascular risk and interventions for reducing that risk. She has identified important psychosocial risk factors for incident and recurrent cardiac events and mortality, and the physiological and behavioral mechanisms by which that risk is conferred. She has also conducted randomized, controlled trials for managing anger or depression to examine possible improvements in quality of life, cardiovascular, and cost outcomes. Davidson has also conducted research in clinical and translational science, particularly in health care system identification of depression and other psychosocial factors related to cardiovascular care.

She has authored over 250 peer-reviewed articles, editorials and book chapters, served as editor for various handbooks, and served on multiple scientific journal editorial boards. She has served as elected President for many of her professional organizations and is a member of the United States Preventive Services Task Force. She also serves as the Chief Academic Officer for New York Presbyterian Hospital.

Stephen Edwards
RTI

Stephen Edwards, Ph.D., has more than 20 years of experience in pharmacology and toxicology across academia, government, and industry. He has experience with data mining, design of web-accessible knowledgebases, ontology-based modeling of biological information, biomarker definition and applications, microarray analysis, sequence analysis, database design, and statistical computing. Prior to joining RTI International, Edwards was a systems biologist at the U.S. Environmental Protection Agency (EPA). In this role, he used computational approaches to describe the mechanisms by which chemicals cause disease in a wide variety of species. This work served as the basis for interpretation of high-throughput toxicity test results allowing thousands of chemicals per week to be screened for toxicity potential. Before joining the EPA, Edwards worked in the pharmaceutical industry where he led a target discovery team focused on novel diabetes targets. The team used biological networks built from genetics and gene expression data to identify potential diabetes targets, which were subsequently nominated for



the Merck high throughput screening program. Edwards has more than 50 peer-reviewed publications and was the Chief Architect of the Adverse Outcome Pathway Wiki.

Zahi Fayad

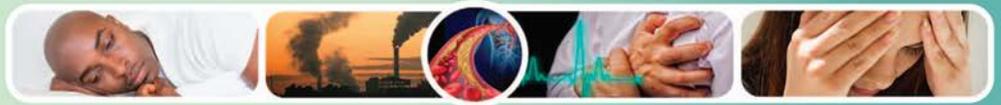
Mount Sinai School of Medicine

Zahi Fayad, Ph.D., serves as professor of Radiology and Medicine at the Mount Sinai School of Medicine. He is the founding Director of the Translational and Molecular Imaging Institute; Vice-Chair for Research, Department of Radiology at the Icahn School of Medicine at Mount Sinai. Fayad's interdisciplinary and discipline bridging research, from engineering to biology and from pre-clinical to clinical investigations, has been dedicated to the detection and prevention of cardiovascular disease with many seminal contributions in the field of multimodality biomedical imaging (MR, CT, PET and PET/MR) and nanomedicine. His work has recently expanded in understanding the effect of stress on the immune system and cardiovascular disease. He has authored more than 300 peer-reviewed publications, 50 book chapters, and over 500 meeting presentations. He is currently the Principal Investigator (PI) of 5 federal grants (4 R01s and 1 P01) funded by the National Institutes of Health's National Heart, Lung and Blood Institute and National Institute of Biomedical Imaging and Bioengineering. He is also PI on three NIH sub-contracts with University of California, San Diego, Columbia University, and the Brigham and Women's Hospital. In addition, he serves as Principal Investigator of the Imaging Core of the Mount Sinai National Institute of Health (NIH)/Clinical and Translational Science Awards. He is a PI of one of the 3 projects in the Strategically Focused Prevention Research Network Center grant funded by the American Heart Association to promote cardiovascular health among high-risk New York City children, and their parents, living in Harlem and the Bronx.

Robert Furberg

RTI

Robert Furberg, Ph.D., is a senior clinical informaticist in RTI International's Digital Health and Clinical Informatics program, where he conducts future-oriented research on technology-enabled behavior change. Furberg has conducted numerous studies on digital health interventions for the Agency for Healthcare Research and Quality, Centers for Disease Control and Prevention, National Institutes of Health, National Science Foundation, and private sponsors including the Robert Wood Johnson Foundation. As the director of RTI's Integrating Signals and Human Response initiative, Furberg brings together researchers, engineers, clinicians, and informaticists to establish novel methods for collecting and aggregating sensor-based, passive, and longitudinal data. The team's current work focuses how sensor data can be used to support risk assessment to generate individualized health promotion and disease management strategies.



Chiara Giannarelli

Mount Sinai School of Medicine

Chiara Giannarelli, M.D., Ph.D., is an Assistant Professor of Medicine and Genetics and Genomics at the Icahn School of Medicine at Mount Sinai. She trained as an Internist with a subspecialty in cardiovascular disease. She obtained her doctorate in pharmacology and pathophysiology and pursued a post-doctoral fellowship in vascular biology and atherosclerosis. She became an Instructor of Medicine in 2012 and she was promoted to Assistant Professor of Medicine in 2014, of Genetics and Genomic Science in 2016, and of Immunology in 2018.

She has been working in the field of chronic social stress and atherosclerosis using a validated model of depression in *Apoe^{-/-}* mice. Using systems genetics, she has been working on the STARNET and STAGE cardiovascular datasets. She is a co-Investigator of the FAMILIA study that will apply cross-generation genetic and genomic information to improve cardiovascular disease prevention in children. Her laboratory is now using a systems biology approach to infer arterial wall and blood-specific immune networks that govern the immune response at different stages of atherosclerosis. From these human data, she is applying network-driven computational approach to predict new use of existing drugs for cardiovascular disease. Her laboratory is now testing the preclinical efficacy of selected candidate compounds in large animals using in vivo imaging methods.

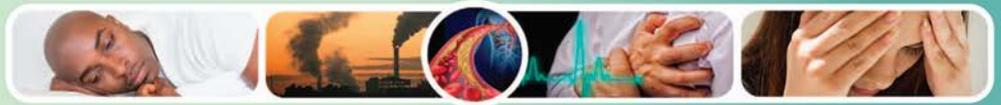
Young-Mi Go

Emory University

Young-Mi Go, Ph.D., is Associate Professor of Medicine at Emory University and Director of Experimental Metabolomics in the Clinical Biomarkers Laboratory. She has a bachelor's degree in biology from Korea University, Seoul, Korea and a doctorate in Molecular Pathology from University of Alabama at Birmingham. She had postdoctoral training in Biochemistry and Medicine in Emory University and became a faculty member in 2009.

Go has extensive experience in environmental stressor-triggered mechanisms of inflammation signaling associated with early atherosclerosis. During her doctorate research with vascular endothelial cells, she found that steady-state laminar flow was atheroprotective while unstable oscillatory shear flow caused a pro-atherogenic phenotype. In her postdoctoral research, Go found that oxidation of extracellular thiol/disulfide redox state is the key factor to stimulate cellular inflammation, and also found that plasma redox state could be a risk factor for cardiovascular disease. In collaboration studies with Dean P. Jones, Ph.D., Go developed redox proteomics methods and identified redox sensitive proteins in inflammation, pro-atherosclerotic signaling and environmental metal-induced toxicity.

Her research career is focused on identifying redox signaling and control mechanisms associated with pulmonary and cardiovascular diseases in respond to environmental stressors.



Her current research examines the redox communication between subcellular compartments that impact critical mechanisms of environmental stressors-associated disease initiation and progression specifically using integrative omics analysis-based systems biology. This strategy uses redox proteomic, metabolomic, transcriptomic and microbiome methods to study communications between subcellular compartments that impact redox signaling and oxidative stress.

David Goff

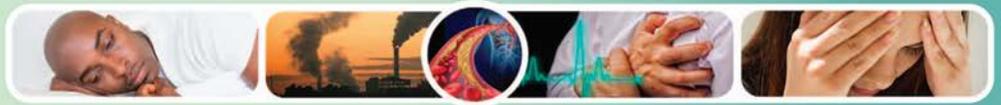
The National Heart, Lung, and Blood Institute (NHLBI)

David Goff, M.D., Ph.D., is Director of Division of Cardiovascular Sciences for NHLBI. In this role, he leads a diverse team of scientists and administrators committed to turning discovery into cardiovascular health. Prior to joining the NHLBI, he served as Dean and Professor of Epidemiology in the Colorado School of Public Health and as Chair of the Department of Epidemiology and Prevention at the Wake Forest School of Medicine. He received his medical doctorate from the University of North Carolina and a doctorate in epidemiology from the University of Texas-Houston School of Public Health. He trained in internal medicine at Baylor College of Medicine in Houston. He is an elected member of the American Epidemiological Society and a Fellow of the American College of Physicians and the American Heart Association. He has published over 300 manuscripts, book chapters, and other scientific reports. The major focus of his research has been on developing, testing, and implementing better strategies for promoting cardiovascular health and preventing cardiovascular disease.

Brooks Gump

Syracuse University

Brooks Gump, Ph.D., is the Falk Family Endowed Professor of Public Health at Falk College at Syracuse University. He completed his doctorate in Experimental Psychology at the University of California, San Diego, followed by a post-doctorate position in Cardiovascular Behavioral Medicine with Karen Matthews, Ph.D. This research focused on children's cardiovascular disease (CVD) risk and the variables predicting acute stress reactivity and subsequent subclinical CVD. Shortly after beginning his first faculty position at State University of New York (SUNY) Oswego, Gump began collaborations with faculty that were engaged in a National Institute of Health-funded longitudinal study of PCB exposure and developmental outcomes (the Oswego Children's Study). Specifically, Gump began to mesh the fields of cardiovascular behavioral medicine with neurotoxicology – testing the potential role of toxicants in modifying acute stress cardiovascular and neuroendocrine responses in this cohort of children. This initial work confirmed that low-level lead was associated with heightened vascular and cortisol reactivity to acute stress. Ongoing research (now at Syracuse University) involves an investigation within a new cohort, the Environmental Exposures and Child Health Outcomes (EECHO) study. In EECHO, 300 children were tested for metal exposure, acute stress reactivity, and subclinical CVD. This



study will also address how other “pressors” such as discrimination might interact and/or exaggerate the effects of toxicant exposures.

Anjum Hajat

University of Washington

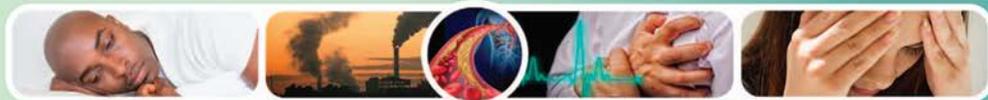
Anjum Hajat, Ph.D., is an Assistant Professor in the Epidemiology Department at the University of Washington’s School of Public Health. She received her doctorate in Epidemiology from the University of North Carolina at Chapel Hill and her Master of Public Health from the University of Michigan. She also holds a bachelor’s in International Relations from the George Washington University in Washington, DC.

Hajat’s current research interests are to understand the social and environmental stressors that disproportionately impact disadvantaged populations and how these stressors impact cardiovascular and other disease endpoints. Specifically, she received a K99/R00 grant from the National Institute of Environmental Health Sciences to study the interaction of air pollution and psychosocial stressors on subclinical atherosclerosis. Hajat has also made contributions to environmental justice research as she seeks to understand how air pollution is distributed across race and social class. Furthermore, she is interested in understanding the mechanisms by which stressors influence health with a focus on biomarkers of stress including cortisol and catecholamines as well as inflammatory and immune markers. Broadly her research has implications for understanding the underlying causes of health disparities.

Jaime Hart

Harvard University

Jaime Hart, Sc.D. is an Assistant Professor of Medicine at the Channing Division of Network Medicine for Brigham and Women’s Hospital and Harvard Medical School. Hart is also an Assistant Professor in the Department of Environmental Health at the Harvard T.H. Chan School of Public Health. She is an environmental epidemiologist and her research focuses on identifying environmental and occupational risk factors for a variety of chronic diseases, including cardiovascular disease and cancer. She is particularly interested in incorporating geographic information system (GIS) technologies and spatial statistics into these fields to improve exposure assessment and to assess the impacts of multiple exposures simultaneously. Her work has been primarily based in large cohort studies based at Brigham and Women’s Hospital and the Harvard T.H. Chan School of Public Health, including the Nurses’ Health Studies, the Health Professional’s Follow-Up Study, and the Trucking Industry Particle Study and in panel studies of potentially susceptible subpopulations.



Michelle Heacock

National Institute of Environmental Health Sciences (NIEHS)

Michelle Heacock, Ph.D., received her doctorate from Texas A&M University in College Station, Texas for her work on the interplay between DNA repair proteins and telomeres. Her postdoctoral work was conducted at NIEHS where she studied the DNA repair pathway, base excision repair. Heacock is currently a program administrator for the Hazardous Substance Research Branch in the Division of Extramural Research at the NIEHS, where she helps to coordinate data science and sharing efforts for the Superfund Research Program. Her current grant portfolio includes research that ranges from telomeres, DNA repair, and Superfund Research Program Center grants.

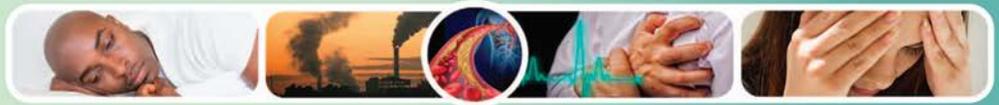
Ronald Hines

U.S. Environmental Protection Agency

Ronald Hines, Ph.D., is the Associate Director for Health, National Health, and Environmental Effects Research Laboratory for the Office of Research and Development in the U.S. EPA. In this position, he manages the research programs of the three laboratory's health divisions, as well as the Research Core Unit.

Hines earned his doctorate in biochemistry from the University of Texas Southwestern Medical School in 1980. Following his postdoctoral fellowship at the University of Vermont College of Medicine, completed in 1983, he became Assistant Professor and, later, Associate Professor at the Eppley Institute for Research in Cancer and Allied Diseases and the Department of Biochemistry at the University of Nebraska Medical Center. Hines was recruited to the Wayne State University School of Medicine as Associate Professor of Pharmacology and in 1995 was promoted to Professor of Pharmacology. In 1999, he accepted a position as Professor of Pediatrics and Pharmacology and Toxicology at the Medical College of Wisconsin, where he also served as Associate Director of the Children's Research Institute and Co-Section Chief of Clinical Pharmacology, Pharmacogenetics, and Teratology in the Department of Pediatrics. Hines moved to his current position in 2012.

Hines currently is a member of the *Drug Metabolism and Disposition* and *Current Topics in Toxicology* Editorial Boards and an Associate Editor for *Toxicological Sciences*. He has more than 140 publications focused on mechanisms whereby exposures to environmental toxicants or drugs alters gene regulation and the genetic and/or epigenetic basis for population- and life-stage susceptibility to exposures.



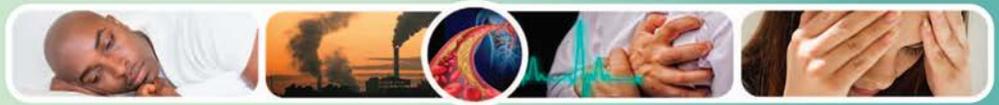
Dean Jones
Emory University

Dean Jones, Ph.D., is Professor of Medicine for the Division of Pulmonary, Allergy, Critical Care, and Sleep Medicine and Adjunct Professor of Biochemistry at Emory University. Jones is also the director of the Clinical Biomarkers Laboratory. He has a bachelor's degree in chemistry from the University of Illinois, Urbana and a doctorate in biochemistry from Oregon Health Sciences University in Portland, Oregon. He was a National Sciences Foundation Postdoctoral Fellow in nutritional biochemistry at Cornell University, Ithaca College, and a visiting scientist in Molecular Toxicology at the Karolinska Institute in Stockholm, Sweden, prior to joining Emory in 1979. In 1997-1998, he was a Nobel Fellow at the Karolinska Institute. Jones has served in several leadership roles at Emory University, many national and international committees and editorial boards. Jones has also served on several grant review panels, including Chair of the Alcohol and Toxicology Study Section for NIH and Basic Mechanisms of Cancer Therapeutics Study Section for the National Cancer Institute. Currently, Jones is a member of the Systemic Injury by Environmental Exposure (SIEE) Study Section for NIH.

Jones studies redox biology and medicine and has extensive experience in cardiovascular disease research, especially in the areas of redox systems biology, environmental health and clinical metabolomics. His research uses a range of molecular and cell biology approaches, mass spectrometry-based proteomics, metabolomics and metallomics, and transgenic mouse models designed to understand complex disease mechanisms. In recent years, he has also developed an exposome research program, building upon the metabolomics and mass spectrometry programs for affordable, high-throughput environmental chemical biomonitoring.

Bonnie Joubert
National Institute of Environmental Health Sciences

Bonnie Joubert, Ph.D., is a Scientific Program Director at the National Institute of Environmental Health Sciences (NIEHS). She co-leads the environmental epidemiology program portfolio, including oversight of projects studying the epidemiology of cardiovascular, respiratory, and metabolic diseases, immunotoxicity, mixtures in epidemiology, and statistical methods development. Joubert received her Master of Public Health in Epidemiology from Tulane University's School of Public Health and Tropical Medicine. Then, Joubert received her doctorate in Epidemiology from The University of North Carolina at Chapel Hill. She has public health and research experience in resource-limited settings, skills as a statistical analyst at Duke University Center for Human Genetics, and is proficient in multiple computing languages. She worked as a post-doctoral environmental health scientist at the EPA and then a research fellow at the NIEHS in the Division of Intramural Research. Her prior research included genetic susceptibility to mother-to-child transmission of HIV, genome-wide association studies of



respiratory disease, and the impact of early life environmental exposures on the newborn epigenome.

Joel Kaufman

University of Washington

Joel Kaufman, M.D., is a physician-epidemiologist, board-certified in internal medicine and occupational medicine. He is a Professor in the Departments of Environmental and Occupational Health Sciences, Epidemiology, and General Internal Medicine at the University of Washington (UW). Kaufman has also served as Interim Dean of the UW School of Public Health since September 2016, where he has been a full-time faculty member since 1997. His current research activities are primarily focused on environmental factors in cardiovascular and respiratory diseases. A major focus of his recent work has been the incorporation of state-of-the-art environmental exposure estimation methods to epidemiological projects, and he has worked closely with the MESA cohort, as well as the Women’s Health Initiative, the Cardiovascular Health Study, and the NIEHS Sister Study. He has led multi-disciplinary research programs that incorporate exposure assessment, toxicology, epidemiology, vascular health, and clinical medicine. Kaufman also leads a laboratory that conducts experimental inhalation studies on health effects of combustion products.

Nicholas Leeper

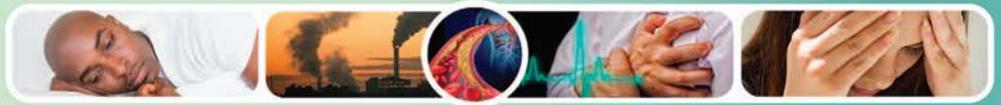
Stanford University

Nicholas Leeper, M.D., is the Chief of Vascular Medicine and Director of Vascular Research at Stanford University. He holds degrees with honors in chemistry and medicine from The University of Chicago and completed his internal medicine training at the University of California, San Francisco. Then, Leeper pursued fellowships in cardiovascular disease and vascular medicine at Stanford University. He cares for patients with aneurysms and peripheral artery disease and leads a research laboratory focused on the genetic determinants of atherosclerosis.

Koren Mann

McGill University

Koren Mann, Ph.D., is the Director of the Molecular and Regenerative Medicine Axis, an Associate Professor of Oncology at McGill University, and a Senior Investigator at the Lady Davis Institute at the Jewish General Hospital. Mann is a member of the Segal Cancer Centre and an associate member of the Goodman Cancer Centre. Mann received her doctorate in pathology and immunology in 1999 from Boston University. Under the direction of David Sherr, Ph.D., she studied how the developing immune system is affected by exposure to polycyclic aromatic



hydrocarbons. She moved to Montreal to complete her post-doctoral training at McGill University, where she researched the use of arsenic as a potential chemotherapy in cancer treatment. Currently, Mann’s laboratory investigates the environmental health effects of metals, including arsenic and tungsten. Her laboratory has focused most recently on understanding the molecular mechanisms leading to arsenic-enhanced atherosclerosis, utilizing in vitro primary cultures and knock-out mouse models.

Jaymie Meliker
Stony Brook University

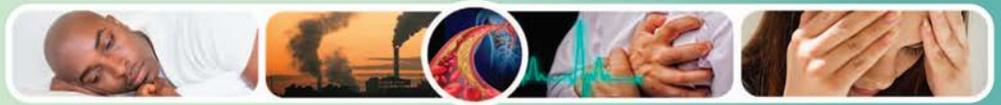
Jaymie Meliker, Ph.D., is a Professor of public health and family, population, and preventive medicine at Stony Brook University. Meliker’s research contributes to the fields of exposure science and environmental epidemiology. His scholarship falls into two lines of inquiry: (1) identifying environmental factors that play important roles in disease morbidity, and (2) developing methods that improve our ability to investigate exposure-disease relationships. Highlights of his work include pioneering development of space-time information systems for lifetime exposure reconstruction, validity assessment of biomarkers of exposure, and epidemiology of low-level exposure to environmental contaminants. He has published more than 70 articles on drinking water contaminants, air pollutants, arsenic, cadmium, asthma, osteoporosis, stroke, and different types of cancers, and enjoys tackling environmental epidemiologic and methodological problems to advance population health.

He served as an elected councilor of the International Society of Exposure Science, is a member of the NIH Infectious, Reproductive, Asthma, and Pulmonary Conditions (IRAP) Review Panel, and a member of the editorial boards of the journals Spatial and Spatio-temporal Epidemiology and PLoSOne.

Meliker received his bachelor’s degree in Neuroscience from Oberlin College, and earned Master of Science and doctorate Environmental Health Sciences and a graduate certificate in spatial analysis and GIS all at the University of Michigan. In addition to his work within academia, he worked as a research scientist at BioMedware Inc., a small research firm in Ann Arbor, Michigan and before that worked as a Sustainability Consultant for the Center for Maximum Potential Building Systems in Austin, Texas.

Andrew Morris
University of Kentucky

Andrew Morris, Ph.D., is a professor of cardiovascular medicine at the University of Kentucky and a research investigator at the Lexington Veterans Affairs Medical Center. Morris’ personal research program studies pathways of lipid metabolism and signaling that are associated with heritable risk of coronary artery disease. In addition, Morris is also an analytical chemist who



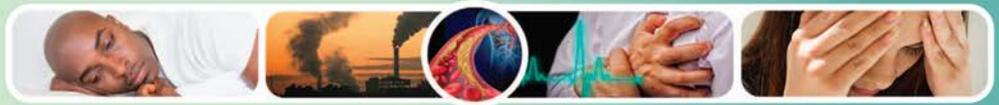
directs a laboratory that conducts targeted and untargeted analysis of small molecules using HPLC and GC coupled mass spectrometry. In this capacity, he leads the Analytical Facility Core of University of Kentucky's NIEHS Superfund and Environmental Diseases Core Centers. Morris' environmental diseases research has focused on studies of interactions between diet and environmental exposures as possible determinants of human disease risk. Morris is also engaged in measurements of environmental chemicals in subjects enrolled in several large longitudinal and interventional studies for cardiovascular disease risk reduction. The possibility that quantitative evaluation of environmental exposures in these kinds of well-characterized cohort studies will enable identification of risk relationships that are difficult to discern in cross sectional studies is of particular interest to Morris.

Matthias Nahrendorf
Harvard University

Matthias Nahrendorf, M.D., Ph.D., is a Professor for Radiology at Harvard Medical School and a Principal Investigator at the Massachusetts General Hospital (MGH) Center for Systems Biology. He also directs the Mouse Imaging Program at MGH. His laboratory focuses on the role of immunity in cardiovascular disease, specifically in atherosclerosis and heart failure. The lab described that after myocardial infarction, the spleen releases a large population of leukocytes that travel to the ischemic heart. Further, his team found that after myocardial infarction, increased sympathetic nerve activity modulates the hematopoietic stem cell niche, activating migration and proliferation of myeloid progenitor cells. This, in turn, accelerated the progression of atherosclerosis, possibly explaining why secondary infarcts are so common in patients. The laboratory develops and employs imaging approaches to sample biology non-invasively, using MR, nuclear, optical and hybrid imaging. Nahrendorf is an editorial board member of *Journal of the American College of Cardiology*; *Circulation Research*; *European Heart Journal*; *Arteriosclerosis, Thrombosis, and Vascular Biology*; *Circulation*; *Science Translational Medicine*; and *The Journal of Nuclear Medicine*. He was the Chair of the 2017 Atherosclerosis Gordon Conference. He has published over 230 articles with an H-index of 72. Nahrendorf received the MGH Research Scholar prize in 2014 and the Basic Research Award of the German Society of Cardiology in 2015.

Ana Navas-Acien
Columbia University

Ana Navas-Acien is a physician-epidemiologist with a specialty in Preventive Medicine and Public Health and a doctorate in Epidemiology. Her research investigates the long-term health effects of widespread environmental exposures, their interactions with genetic and epigenetic variants, and effective interventions for reducing involuntary environmental exposures. For more than 10 years she has been working on environment-related research in population-based cohort studies such as the Strong Heart Study, a study of cardiovascular disease and its



risk factors in American Indian communities, and the Multi-Ethnic Study of Atherosclerosis (MESA), a study of cardiovascular, metabolic and lung disease in urban settings across the U.S. She is also part of the TACT2 study team, an ongoing clinical trial of metal chelation for secondary cardiovascular disease prevention. Both in the U.S. and internationally, she conducts research to evaluate exposure to tobacco smoke including emerging public health challenges such as waterpipe smoking and e-cigarettes. Her goals are to contribute to the reduction of environmental health disparities, especially in disproportionately exposed populations.

Michelle Olive

The National Heart, Lung, and Blood Institute

Michelle Olive, Ph.D., is the Deputy Branch Chief of the Atherosclerosis and Coronary Artery Disease Branch (ACAD), at the Cardiovascular Sciences Division of the National Heart Lung and Blood Institute (NHLBI) extramural program at NIH. The ACAD Branch conducts and manages an integrated basic and clinical research program to study the etiology, pathogenesis, prevention, diagnosis, and treatment of CAD and atherothrombosis. Olive manages a basic, translational and early clinical research portfolio in the areas of atherosclerosis, vascular biology, inflammation, non-coding genome, microbiome and rare vascular diseases. She also oversees a trans-NIH program that fosters collaboration between Intramural and Extramural Investigators and the NIH Clinical Center and she manages a program on long non-coding RNA in cardiovascular, lung, blood, and sleep Research.

Rakesh Patel

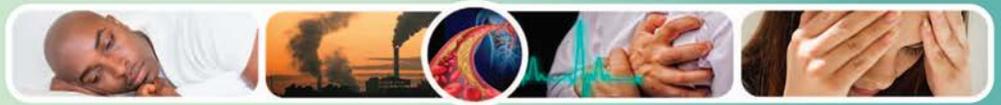
University of Alabama

Rakesh Patel, Ph.D., received his doctorate in biochemistry from the University of Essex, England in 1996. He moved to the University of Alabama at Birmingham in 1997 to pursue post-doctoral training. Patel is currently professor and vice chair for research in the Department of Pathology, and director of the University of Alabama Center for Free Radical Biology. His research interests have centered on understanding redox signaling mechanisms, in acute and chronic inflammatory diseases, and using these insights to develop and test therapeutics. Recent interests include focusing on how endothelial N-glycans modulate atherogenesis and how oral microbes modulate nitric oxide bioavailability to control cardio-pulmonary inflammation.

Michael Petriello

University of Kentucky

Michael Petriello, Ph.D., is a broadly trained research scientist with a strong background in molecular toxicology, the environmental health sciences, analytical instrumentation, nutrition,



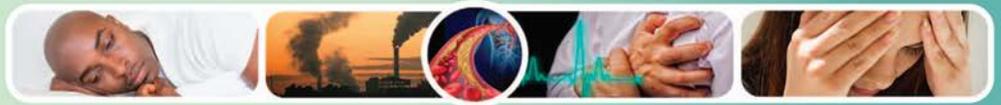
and metabolic diseases. As a member of the University of Kentucky Superfund Research Center (UK-SRC), his doctoral work focused on identifying novel cross-talk mechanisms linking exposure to persistent organic pollutants to increased risk of chronic inflammation. Additionally, Petriello examined if lifestyle modifications, such as increasing the consumption of diets high in anti-inflammatory bioactive nutrients could decrease the toxicity of environmental pollutants. As a UK-SRC postdoctoral scholar, Petriello received interdisciplinary training that provided him with a unique skillset to gauge the impact of hazardous waste exposure on communities and to determine effective means to communicate his research findings to stakeholders. In addition to his graduate and postdoctoral studies, he had the unique opportunity to advance his scientific career by working in the lab of Sudha Biddinger at Boston Children's Hospital. As a visiting scientist, he examined the role of the xenobiotic detoxification enzyme Flavin-containing monooxygenase 3 (FMO3) in glucose and insulin signaling. Returning to Kentucky, Petriello received a T32 training grant within the Cardiovascular Research Center and began working with Andrew Morris, Ph.D., on identifying clinically relevant biomarkers in humans that link dietary choices and metabolic disease. This collaboratively designed postdoctoral experience has substantially increased his knowledge of mass spectrometry as well as cardiovascular disease and associated metabolic disorders. During the second and third years of his post-doctorate, he began to collaborate closely with representatives from the Centers for Disease Control and Prevention and NIH to examine the importance of his preclinical observations in a human population highly exposed to environmental pollutants.

Arshed Quyyumi
Emory University

Arshed Quyyumi, M.D., is a Professor of Medicine in the Division of Cardiology at Emory University School of Medicine and Co-Director at the Emory Clinical Cardiovascular Research Institute (ECCRI). After his medical training in London, he completed his fellowship at Harvard University and in Intramural NIH, where he directed the cardiac catheterization laboratory before arriving at Emory. Over the last 30 years, his research has focused on clinical and translational cardiovascular sciences in topics including mechanisms of myocardial ischemia, endothelial vascular biology, stem cells and progenitor cells, biomarkers, health disparities, cardiovascular genomics and metabolomics. Under his direction, ECCRI conducts clinical trials and several training programs. He has published over 400 manuscripts, book chapters, and reviews in peer-reviewed journals.

Thomas Register
Wake Forest University

Thomas Register, Ph.D., is Professor of Pathology, Section on Comparative Medicine at Wake Forest School of Medicine (WFSM) in Winston-Salem, NC. He received his bachelor's degree in chemistry from Francis Marion College in 1979 and his doctorate in chemistry from the



University of South Carolina in 1985. He was a post-doctoral fellow in the Atherosclerosis Training Program at WFSM before joining the faculty. His research interests include the effects of hormones and dietary constituents, including isoflavones, on atherosclerosis and cardiovascular disease as well as other age-related conditions.

Register employs molecular, cellular, and imaging approaches in basic, translational, epidemiologic, and genetic studies. His over 160 publications have contributed to the understanding of hormone and diet effects on inflammation, atherogenesis, and arterial and skeletal biology. He has worked to develop the nonhuman primate as a model of aging, body composition, and physical function, and he is utilizing the model to explore in depth at the tissue level imaging findings from human studies. Administratively, he directs the Comparative Medicine Clinical Chemistry Laboratory, where he expanded laboratory capabilities to cover a variety of specialty endocrine, skeletal, adipose, and CV marker assays.

Register has experience training Ph.D., D.V.M., and M.D. scientists, mentoring dozens of pre-doctoral students, postdoctoral fellows, and junior faculty. Mentees have gone on to careers in medicine and the biomedical sciences in the U.S., Canada, Europe, and Asia. He is a Fellow of the American Heart Association and Endocrine Society, and a regular reviewer for NIH and international study sections.

Glenn Rice

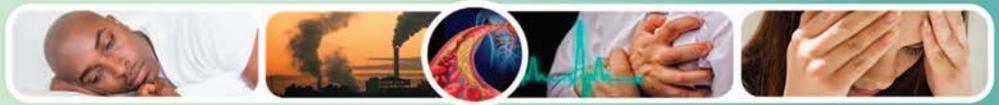
U.S. Environmental Protection Agency

Glenn Rice has been an Environmental Health Scientist in the U.S. EPA's National Center for Environmental Assessment (NCEA) since 1990. His research interest is human health risk assessment methods. He is one of the primary authors of the EPA's Supplementary Guidance for the Health Risk Assessment of Chemical Mixtures, EPA's Concepts, Methods, and Data Sources for Cumulative Health Risk Assessment of Multiple Chemicals, Exposures, and Effects, and EPA's Reanalysis of Dioxin Toxicity and Dioxin Toxicity Equivalence Factor Documents. Glenn has served as the President of the Ohio Chapter of the Society of Risk Analysis. He holds a doctoral degree in environmental science and risk management from the Harvard School of Public Health, a Master's of Science in microbiology from Miami University, as well as degrees in biology and chemistry from Thomas More College.

Cynthia Rider

National Toxicology Program

Cynthia Rider, Ph.D., is a toxicologist with the National Toxicology Program (NTP), National Institute of Environmental Health Sciences (NIEHS), where she serves as project leader for a diverse portfolio of testing programs including polycyclic aromatic compounds, botanical dietary supplements (e.g., *Ginkgo biloba* extract, *Garcinia cambogia*), and industrial chemicals.



In this capacity, she leads multi-disciplinary study design teams in developing research programs to address critical data gaps and inform risk assessment. Rider's research interests are in evaluating and refining methods to predict mixture toxicity based on data from components or whole reference mixtures. She co-chairs the NIEHS Combined Exposure/Mixtures working group tasked with advancing mixtures research throughout the Institute. Rider received her bachelor's from Tulane University and her doctorate from North Carolina State University in Environmental Toxicology (2005). She completed postdoctoral training in the Reproductive Toxicology Branch of the U.S. Environmental Protection Agency and Duke University, Nicholas School of the Environment, and became a Diplomate of the American Board of Toxicology in 2011.

Andrew Rooney

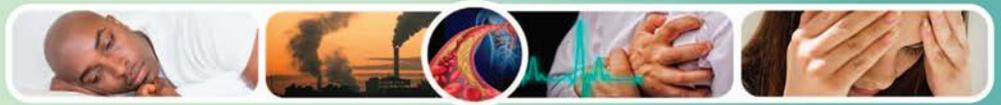
National Institute of Environmental Health Sciences

Andrew Rooney, Ph.D., is the acting director of the Office of Health Assessment and Translation (OHAT) in the National Toxicology Program (NTP) at National Institute of Environmental Health Sciences (NIEHS). He has over 25 years of experience in toxicology and risk assessment for the protection of public health resulting in contributions to the peer-reviewed literature and government assessments (e.g., NTP Monographs, U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS) Toxicological Reviews, World Health Organization (WHO) Guidelines), published review protocols (European Food Safety Authority (EFSA's) Bisphenol A (BPA) systematic review protocol), and authoritative documents such as a report by the National Academy of Sciences. Rooney has been actively involved in developing risk assessment methods and guidance throughout his professional career. Most recently, he has been collaborating on methods to advance and harmonize systematic review methodologies for addressing environmental health questions. He led the team that developed the OHAT Approach to Systematic Review and Evidence Integration. Given the time and resource commitments of systematic reviews, his group is adapting systematic evidence mapping methods to serve as a problem formulation step and improve efficiencies, as well as transparent interactive scoping review product. He is active in several study quality methods projects considering updated risk of bias approaches for observational human studies, experimental animal studies, and mechanistic studies. Rooney has a Master of Science and Doctorate in Zoology from the University of Florida.

Carol Shively

Wake Forest University

Carol Shively, Ph.D., has been on the faculty of Wake Forest School of Medicine for over 30 years. She is a Professor in the Department of Pathology and Comparative Medicine and holds appointments in the Department of Physiology and Pharmacology, the Clinical and Translational Science Institute, the Sticht Center for Healthy Aging and Alzheimer's Prevention, the Program

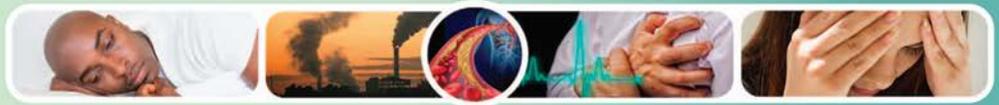


for Complementary and Integrative Medicine, the Cardiovascular Research Center, and the Center for Diabetes, Obesity and Metabolism, and is the Director of the Office of Women in Medicine and Science.

Shively received her doctorate in psychology from the University of California, Davis in 1983, completed a postdoctoral fellowship at Wake Forest School of Medicine, and was appointed to the faculty of Pathology and Comparative Medicine in 1986. Shively won the National Association for Women's Health Annual Award for Excellence in Research, and is listed in Who's Who of American Women, and International Who's Who. She reviews and consults for NIH, has been a primate center site visitor for 29 years, reviews for numerous journals, has been a guest editor for several journals, and recently published an edited volume on Social Inequalities in Health in Nonhuman Primates. She has authored over 200 research publications and is a leader in the development of nonhuman primate (NHP) models of human health, particularly those that involve social and psychological impacts on human health.

Sanjay Srivastava
University of Louisville

Sanjay Srivastava, Ph.D., is a Professor of Medicine and Distinguished University Scholar at University of Louisville. Srivastava also serves as the Director of University of Louisville's Superfund Research Center. For the past 20 years, his research has focused on the cardiovascular toxicity of environmental toxins, such as volatile organic compounds, tobacco products and metals, precursors of advanced glycation end products, and aldehydes generated from the oxidation of lipids. We have established several LC-MS/MS and GC-MS based assays for the characterization of carbonyls and their metabolic products. His current research is focused on delineating the mechanisms by which environmental pollutants cause vascular inflammation, insulin resistance, and atherosclerosis. Srivastava's recent studies suggest that toxicants such as acrolein, HNE, and arsenic cause endothelial cell and macrophage activation and induce vascular inflammation by triggering endoplasmic reticulum (ER) stress. To further examine the contribution of ER-stress on endothelial activation, Srivastava and his team have generated mice lacking ER-stress responsive proteins (XBP-1 and PERK) in endothelial cells. To examine the effect of endogenous and environmental aldehydes they have made transgenic mice overexpressing aldehyde quencher carnosine synthase in macrophages. Recently, Srivastava also established new LDL receptor-null and apoE-null rat models of atherosclerosis. The LDL receptor-null rats are dyslipidemic, obese and glucose intolerant and upon feeding the western diet, the rats develop aortic lesions.



Catherine Stoney

The National Heart, Lung, and Blood Institute

Catherine Stoney, Ph.D., is a health psychologist and psychophysiological with specialization in behavioral cardiology. Stoney has wide-ranging expertise in stress, psychopathology, and cardiovascular disease. She takes a special interest in studying the behavioral, physiological, and psychological pathways by which psychosocial factors and diseases of the heart and cardiovascular system are linked and modified. Stoney is currently Acting Deputy Branch Chief and Program Director in the Clinical Applications and Prevention Branch in the Division of Cardiovascular Sciences at National Institutes of Health's National Heart, Lung, and Blood Institute (NHLBI). With NHLBI, she is involved in a number of clinical trials, as well as a program in implementation science. Prior to joining NIH, Stoney was Professor of Psychology at The Ohio State University, where she conducted laboratory and clinical investigations of phenotypes associated with patterns of coping with psychosocial stress, examinations of psychological factors that impact metabolic and inflammatory processes, clinical interventions to reduce physiological stress responses, and the biologic and cognitive mechanisms which may affect the progression of cardiovascular risk.

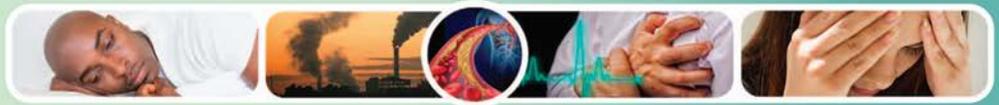
William Suk

National Institute of Environmental Health Sciences

William Suk, Ph.D., is director of both the Superfund Research Program and the Hazardous Substances Research Branch in the NIEHS Division of Extramural Research and Training.

He is affiliated with a number of organizations and committees including: Roundtable on Environmental Health Sciences, Research, and Medicine, Institute of Medicine, National Academy of Sciences; International Advisory Board of the Chulabhorn Research Institute, Bangkok, Thailand; and World Health Organization Consultation on Scientific Principles and Methodologies for Assessing Health Risks in Children Associated with Chemical Exposures. He also sits on a number of trans-NIH committees.

The NIH has honored him for his many efforts, and he has received the HHS Secretary's Award for Distinguished Service. He has been a National Science Foundation fellow and is a recipient of the Roy E. Albert Memorial Award for Translational Research in Environmental Health from the University of Cincinnati; the Child Health Advocacy Award from the Children's Environmental Health Network; the John P. Wyatt Lecture Award in Environmental Health and Disease from the University of Kentucky; and the Adel F. Sarofim Award for Outstanding Professional Achievement in Championing Research on the Origin, Fate, and Health Effects of Combustion Emissions. He is also a fellow of the Collegium Ramazzini. Suk received his doctorate in microbiology from the George Washington University, and his Masters in Public Health in health policy from the University of North Carolina at Chapel Hill Gillings School of Global Public Health.



Filip Swirski

Massachusetts General Hospital

Filip Swirski, Ph.D., is the Patricia and Scott Eston Research Scholar at Massachusetts General Hospital (MGH) and an Associate Professor for Harvard Medical School. In 2004, Swirski obtained his doctorate in immunology from McMaster University in Canada. In 2007, he completed his postdoctoral studies in vascular biology at Brigham and Women’s Hospital and MGH and was recruited to the Center for Systems Biology at MGH and Harvard Medical School. Currently, his research is supported by grants from the National Institutes of Health and the American Heart Association. Swirski studies innate immunity and inflammation. Swirski is a member of the Harvard Immunology Ph.D. program.

Cavin Ward-Caviness

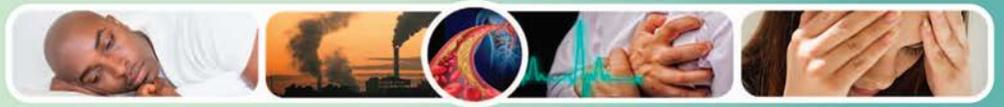
U.S. Environmental Protection Agency

Cavin Ward-Caviness, Ph.D., is a Principal Investigator for the Environmental Public Health Division at the U.S. Environmental Protection Agency. His work focuses on understanding sensitivity to air pollution from a variety of angles. Ward-Caviness includes the perspective of race and socioeconomic status, clinical and disease history, in addition to genetics, epigenetics, and other molecular and ‘omics factors. His work mostly focuses on understanding sensitivity to air pollutants as they impact cardiovascular disease and the aging process. In addition to understanding individual-level sensitivity to air pollutants, Ward-Caviness uses a variety of approaches to understand air pollution sensitivity and population-specific effects including analysis of large electronic health record databases and longitudinal cohorts. His work also seeks to understand the molecular underpinnings linking air pollutant exposure to health by examining the modification of metabolic pathways, epigenetic markers, and the response of potentially causal biomarkers to air pollutant exposure. Ward-Caviness’ has recently worked with more translational science and is interested in the communication and utilization of scientific knowledge on air pollutants by healthcare practitioners and the general public. Effective communication of robust and actionable scientific results is a key step in public health awareness and improvement.

Changcheng Zhou

University of Kentucky

Changcheng Zhou, Ph.D. received his doctorate from the University of California, Irvine. He performed postdoctoral work for University of Washington and Rockefeller University before joining the faculty at University of Kentucky. Zhou is currently an Associate Professor in the Department of Pharmacology and Nutritional Sciences and the director of Center for Metabolic



Disease Research at University of Kentucky. His main research interest is molecular mechanisms of atherosclerosis and metabolic disorders. Zhou is an elected Fellow of the American Heart Association and a charter member of the NIH Vascular Cell and Molecular Biology study section.



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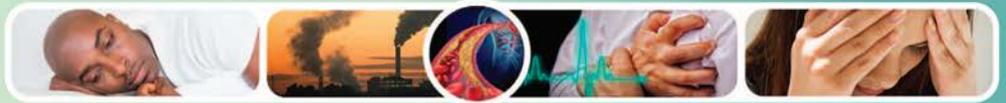
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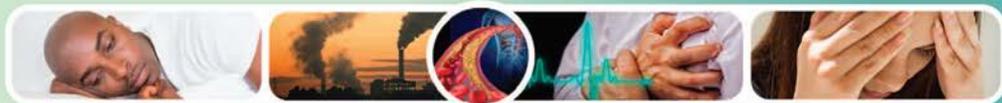
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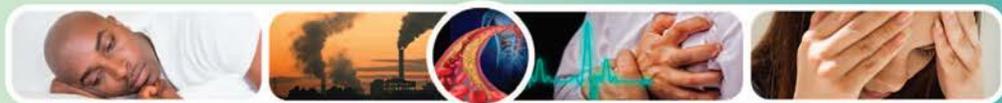
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**Understanding the Combined Effects
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Stressors: Atherosclerosis as a Model**